

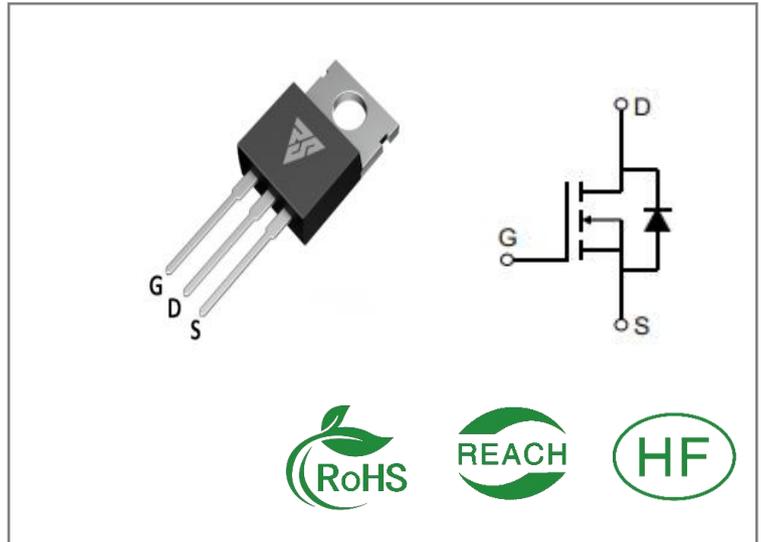
ID	R <sub>DS(ON)</sub> (Typ)	VDSS
100A	6.6mΩ	120V

**Applications:**

- Load Switch
- PWM Applications
- Power Managment

**Features:**

- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability


**Ordering Information**

Part Number	Package	Marking	Packing	Qty.
RS120N100UT	TO-220	120N100UT	Tube	50 PCS

**Absolute Maximun Ratings** Tc= 25°C unless otherwise specified

Symbol	Parameter	RS120N100UT	Units
VDSS	Drain-to-Source Voltage	120	V
ID	Continuous Drain Current TC=25°C	100	A
ID	Continuous Drain Current TC=100°C	54	
IDM	Pulsed Drain Current	360	
PD	Power Dissipation	129	W
VGS	Gate- to- Source Voltage	±20	V
EAS	Single Pulse Avalanche Engergy L=0.5mH,VDD=50V, VG=10V, RG=25Ω,IAS=30A,Tj = 25°C	225	mJ
TL TPKG	Maximum Temperature for Soldering	300	°C
	Leads at 0.063in(1.6mm)from Case for 10 S Package Body for 10 seconds	260	
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 150	

\* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the“ Absolute Maximum Ratings” Table may cause permanent damage to the device.

**Thermal Resistance**

Symbol	Parameter	RS120N100UT	Units	Test Conditions
R $\theta$ JC	Junction-to-Case	0.97	°C / W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 150 °C
R $\theta$ JA	Junction-to-Ambient	63		1 cubic foot chamber, free air.

**OFF Characteristics** T<sub>J</sub>= 25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	120	--	--	V	VGS=0V ID=250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	VDS=120V VGS=0V
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	VGS=20V VDS=0V
	Gate- to- Source Reverse Leakage	--	--	-100		VGS=-20V VDS=0V

**ON Characteristics** T<sub>J</sub>=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance	--	6.6	8.6	mΩ	VGS=10V ID=30A
		--	7.7	9.9	mΩ	VGS=4.5V ID=20A
VGS (TH)	Gate Threshold Voltage	1.4	1.9	2.6	V	VGS=VDS ID=250μA

**Resistive Switching Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	13	--	nS	VDD=60V ID=30A RG=6Ω VGS=10V
trise	Rise Time	--	25	--		
td(OFF)	Turn- OFF Delay Time	--	38	--		
tfall	Fall Time	--	34	--		

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	3384	--	pF	VGS= 0V VDS=60V f=1MHz
Coss	Output Capacitance	--	644	--		
Crss	Reverse Transfer Capacitance	--	9.6	--		
Qg	Total Gate Charge	--	40	--	nC	VDS= 60V ID=20A VGS=10V
Qgs	Gate- to- Source Charge	--	9	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	10	--		

**Source- Drain Diode Characteristics**

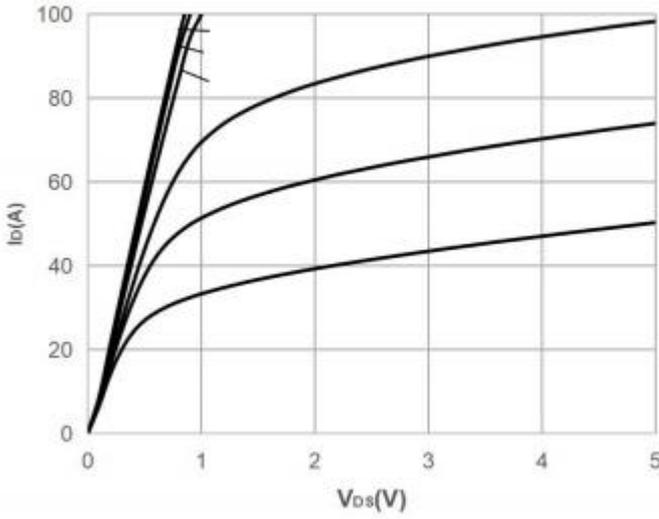
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	100	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	400	A	
VSD	Diode Forward Voltage	--	--	1.2	V	IS=30A VGS=0V
trr	Reverse Recovery Time	--	65	--	nS	IS=15A di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	70	--	nC	

**Notes:**

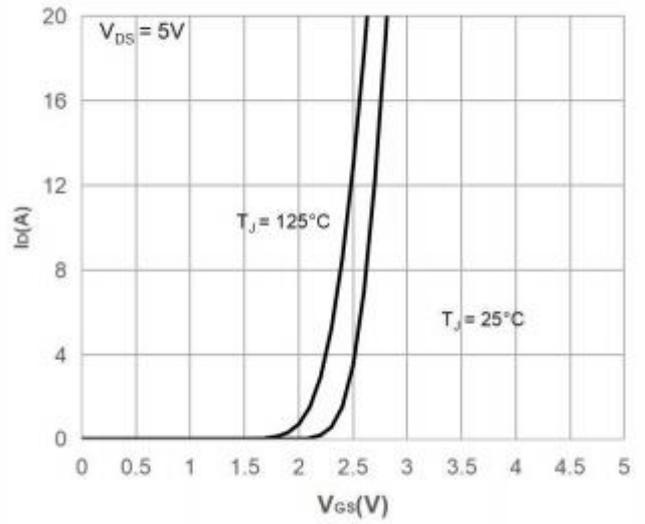
- \* 1. Repetitive rating, pulse width limited by maximum junction temperature.
- \* 2. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 0.5\%$

**Typical Feature Curve**

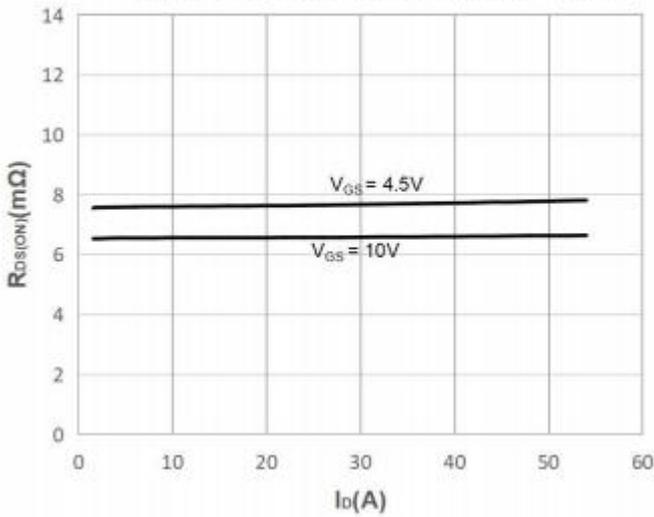
**Figure 1: Output Characteristics**



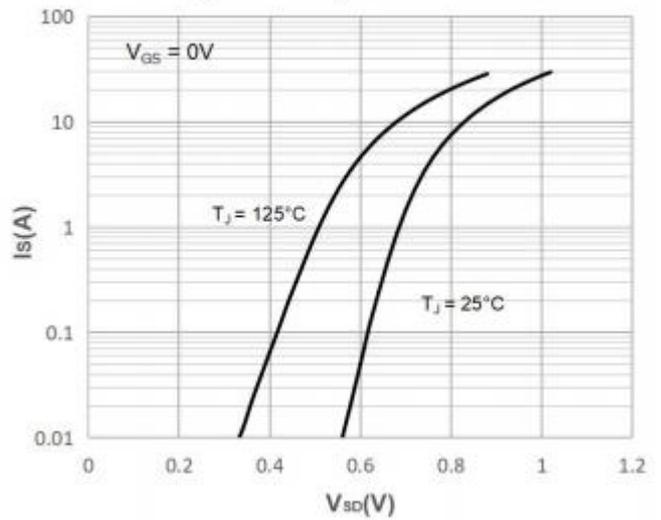
**Figure 2: Typical Transfer Characteristics**



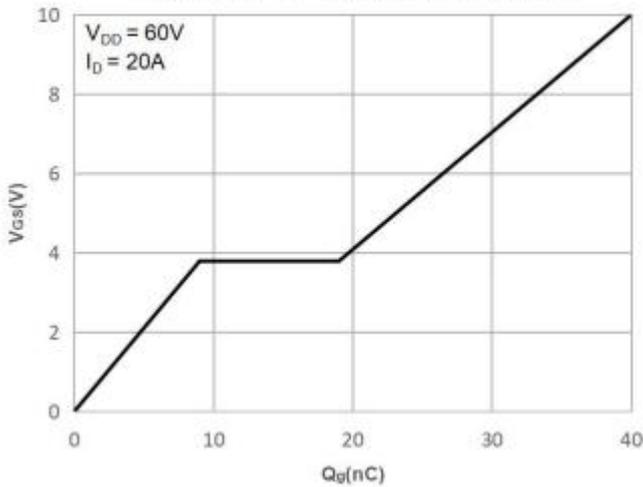
**Figure 3: On-resistance vs. Drain Current**



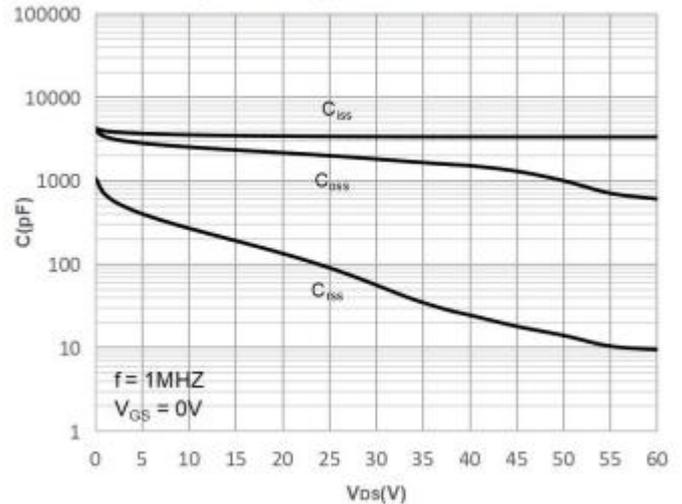
**Figure 4: Body Diode Characteristics**



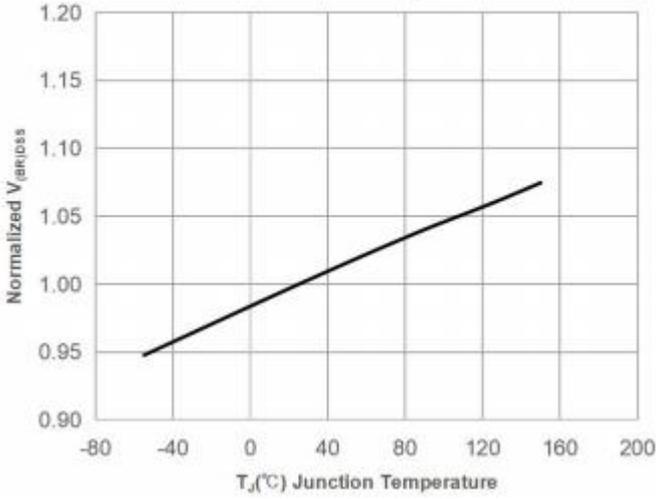
**Figure 5: Gate Charge Characteristics**



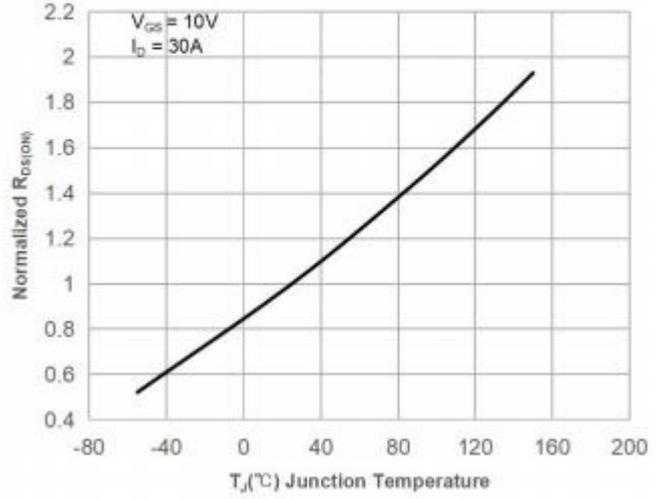
**Figure 6: Capacitance Characteristics**



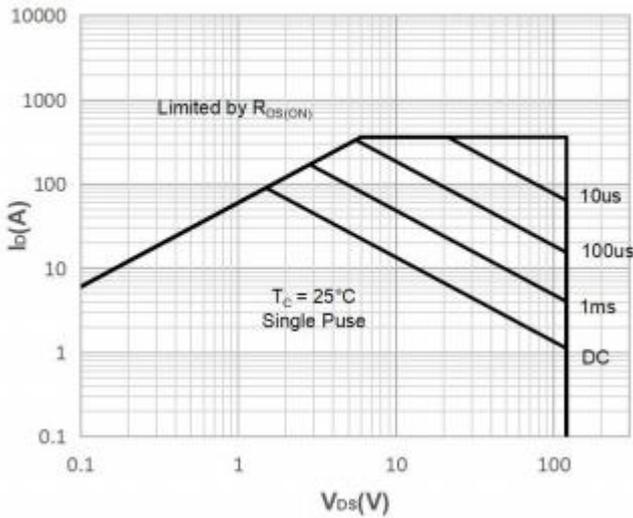
**Figure 7: Normalized Breakdown voltage vs. Junction Temperature**



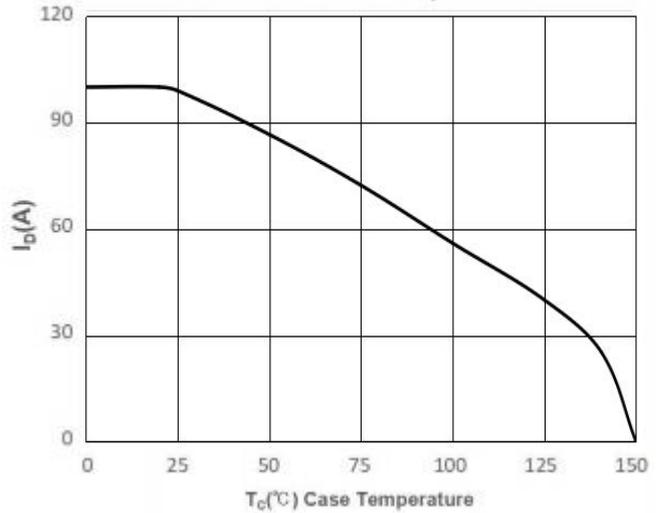
**Figure 8: Normalized on Resistance vs. Junction Temperature**



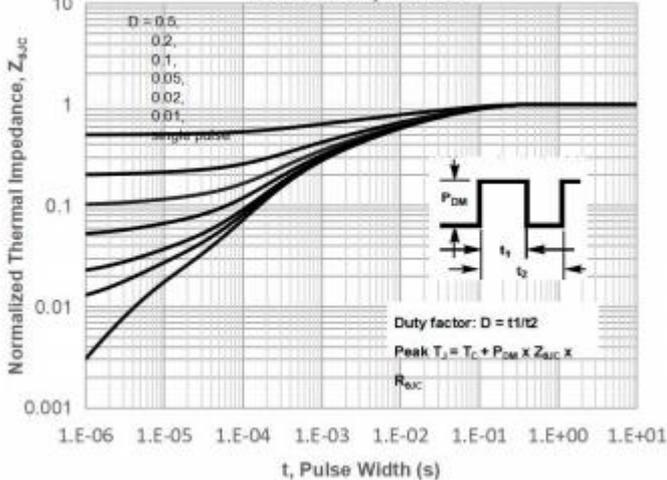
**Figure 9: Maximum Safe Operating Area**



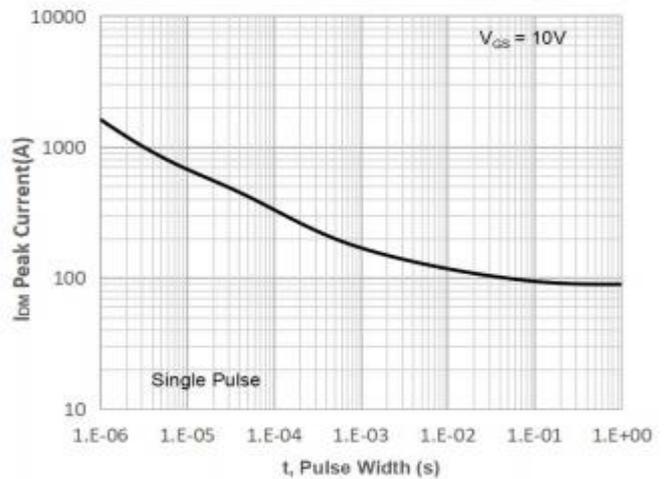
**Figure 10: Maximum Continuous Drain Current vs. Case Temperature**



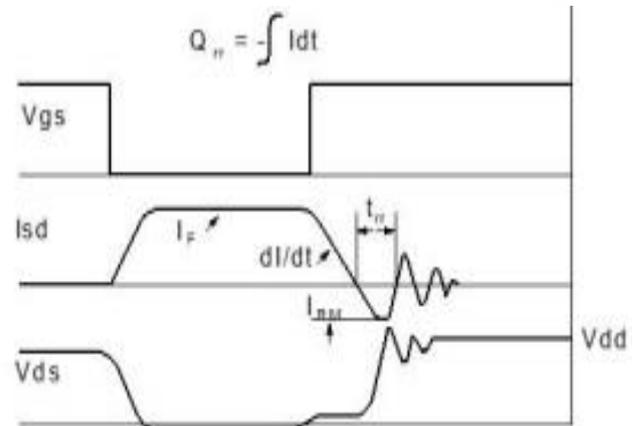
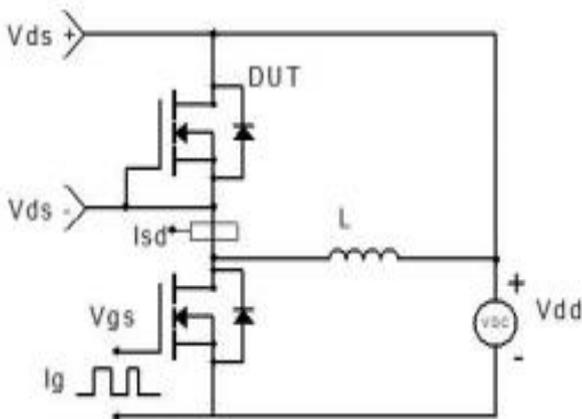
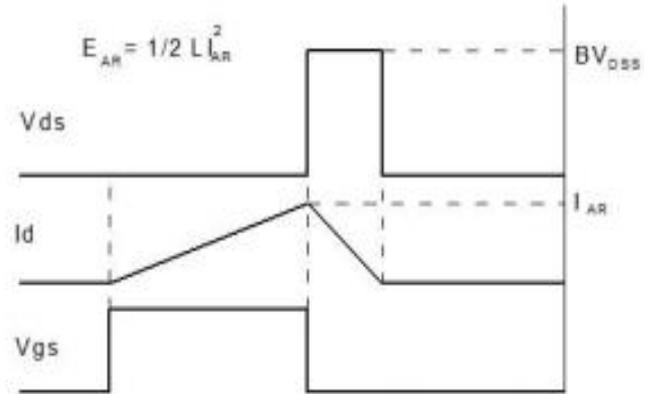
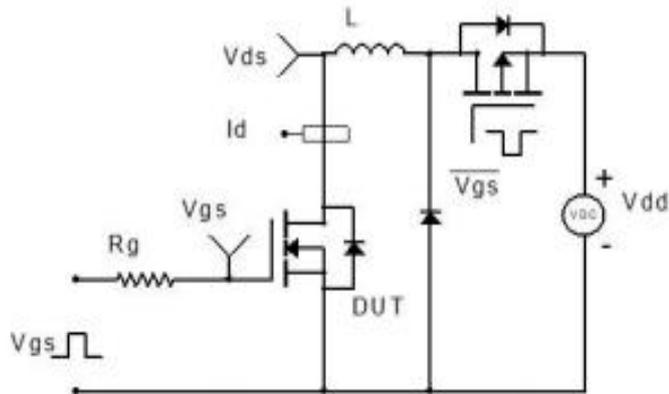
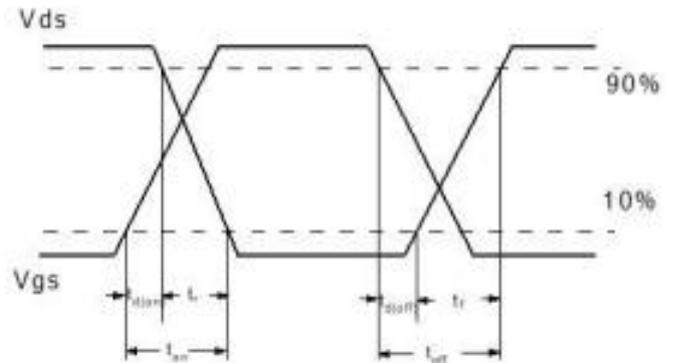
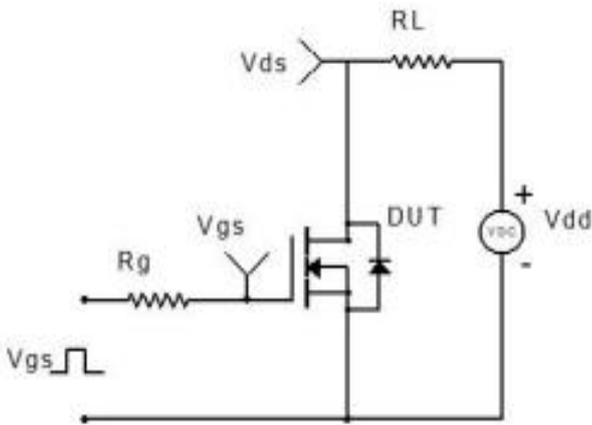
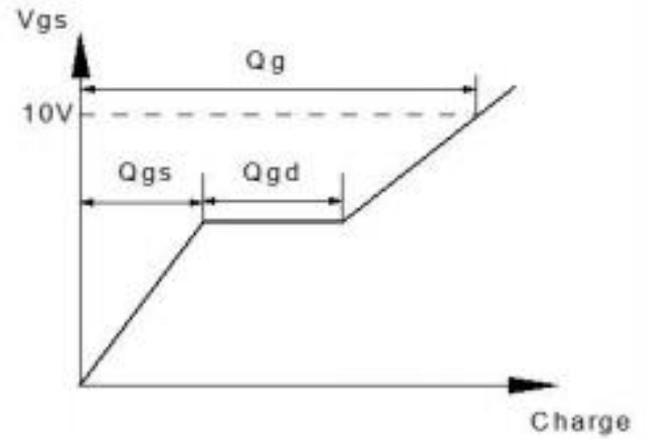
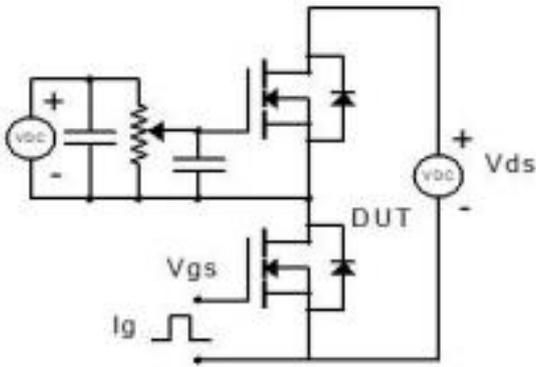
**Figure 11: Normalized Maximum Transient Thermal Impedance**



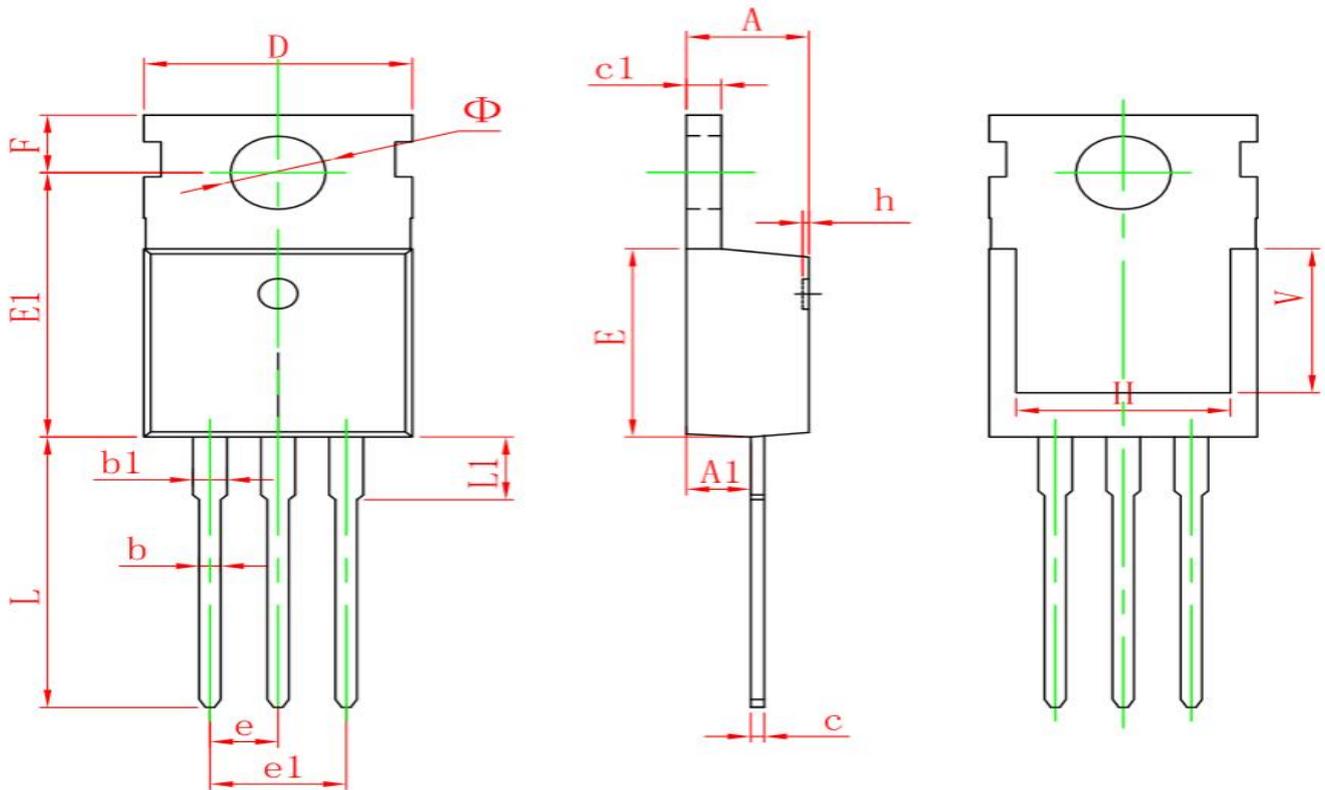
**Figure 12: Peak Current Capacity**



**Test ircuits and Waveforms**



Package outline drawing(TO-220 Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150

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